Operating manual

Operation Module

OM 2002
OM 2008

Edition 04/2021

- Original language German -

This operating manual is applicable for the following modules:

Rotary pulse encorder OM 2002	92605 XXXX
Keyboard module OM 2008	92483 XXXX

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Important Notice

This operating manual cannot take every possible installation, operation issue or possible faults into consideration.

Should you require further information, or particular problems occur, which are not specifically covered in this operating manual then please contact Herkules-Resotec Elektronik GmbH.

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Disclaimer

We have checked this documentation in the conformity with the described products. Nevertheless, discrepancies cannot be fully ruled out, therefore we cannot be held liable for the correctness of the document as a whole. The documentation is checked regularly. Corrections are added to the next publication editions.

Technical changes reserved.

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1 Description of the operation module

different module types

The operation modules enable an extension of the control systems for automation engineering. For this, there are different module variants, a keyboard module with 8 keys and a rotary encoder module with two keys and two rotary encoders. All modules are equipped with different interfaces and can be combined and strung together.

The operational condition of your facility is displayed with the operation modules. Hence, you are able to actively control an operational production process.

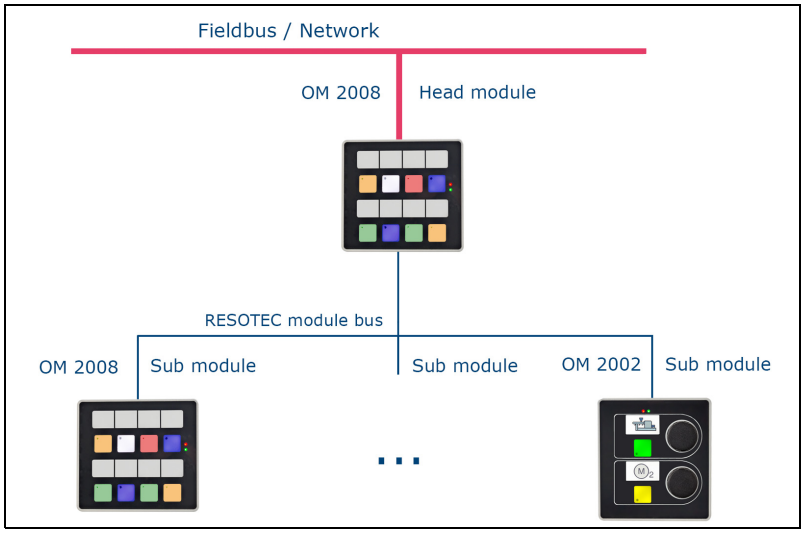
Particular advantages are that the operation module replaces individually mounted and wired buttons and LEDs and are parametrised ready for operation. The installation time and the increased reliability during operation is comparatively much better than when using conventional wiring.

compatible mode

The OM 2008 and OM 2002 operation modules can be used in compatible mode as replacements for the OM 100 / OM 2X0.

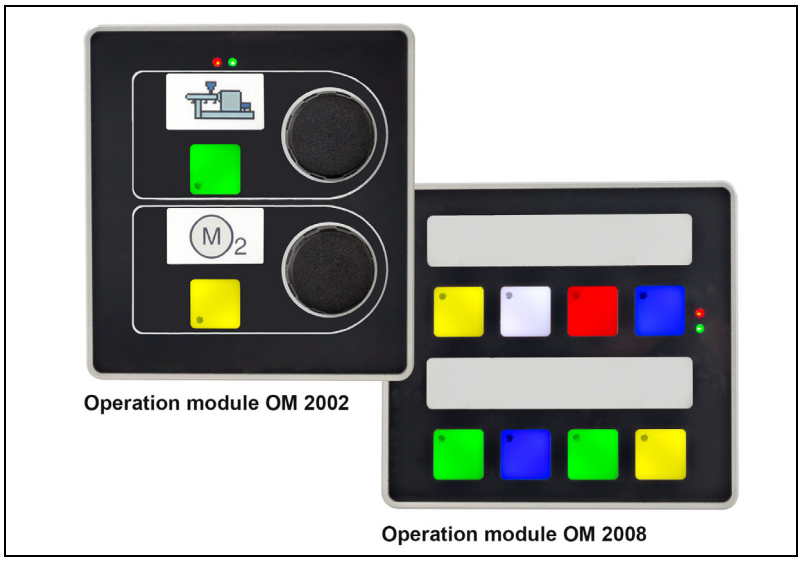
Data exchange between several operation modules

The necessary data is exchanged between the operation module and higher-level control via a communication protocol. Data from multiple operation modules is collected, via further, internal, serial data connections, in a single operation module and can then be exchanged with the higher-level control (the figure shows the system structure of the operation modules).



All operation modules are equipped with coloured keys (5-colour panel-LEDs, red, green, yellow, blue and white), each with a status-LED (red). Thus, you are able to use many different colours to show diverse combinations giving a clear indication of the feedback from the system.

You also have the possibility to name the keys with the labelling strips.



The **operation module OM 2008** is comprised of:

- 8 short-stroke keys (5 colours) each with a status-LED
- Field bus interface (optional): PROFINET®IO Device, Modbus®RTU, PROFIBUS®-DP Slave, Ethernet/IP® Device
- Internal Interface: RESOTEC module bus

The **operation module OM 2002** is comprised of:

- 2 rotary pulse encoders, 8 bit up/down counter, for controlling drives. Each rotary pulse encoder is additionally equipped with a pressing function (can be used as a key)
- 2 short-stroke keys (5 colours) each with a status-LED
- Internal Interface: RESOTEC module bus

2 Safety instructions

2.1 Basic safety instructions

This user manual is designed for technically qualified personnel who are equipped with relevant knowledge of automation technology.

Important!
Latest operating instructions on our homepage

This user manual is a part of the operation module and will be required for future installations.
For the operation modules all information is always valid in a actual version on our homepage (www.herkules-resotec.de). The information in this document is therefore not necessarily up to date. Therefore, always make sure you have the latest version.

Inform about the correct installation and commissioning!

The user manual provides all information regarding the usage and operation of the operation module when using the device in the designated way. Please read the first chapter of the user manual before you begin the installation and mounting of the operation module. It will help to avoid mistakes and will protect you, the operation module and connected machine from possibility of damage due to faulty connection and incorrect usage..

Warning!
Personal or material damage

- If you do not follow the safety precautions and instructional information, sources of danger can be created and safety functions may not operate accordingly. Person and material damage are potential consequences.
- Always follow the respective safety and accident prevention guidelines, regardless of the here detailed safety instructions.

Warning!
Personal or material damage

- The project developer of a facility control responsible for setting up all measures to ensure that communication failures, voltage drops or power failure do not hinder a restart of the operation after a program cycle is interrupted.
  A dangerous operating state is not allowed to occur throughout the duration of the control program, including during troubleshooting, not even for a short time.

open operating equipment

- The operation module is open operating equipment. That means, it must be mounted in a switch cabinet or on a switch board and is operated from the front.
  Access to the switch cabinet or switch board must be limited by use of a key or specialised tool to prevent anyone other than qualified and approved personnel.

Electrostatic-sensitive components, do not open the operation module!

- There are ESD-sensitive components built inside the operation module which can be impaired or destroyed through electrostatic discharge. Therefore, never attempt to open the operation module yourself. Incorrect handling of the operation module can damage it. Only allow it to be repaired by a qualified specialist.

Qualified personnel

A qualified person is someone who,

1. who, as project planning personnel, are familiar with the safety concepts of automation technology,.
2. as an operator, has received instruction on the use of components within, as well as the operation of, automation technology.
3. as the start-up and/or service engineer, has a qualification and/or received instruction regarding the repair of the automation technology in question. More specifically, personnel with the authority to start up electrical circuits and devices according to the prescribed safety standards, to earth and to label.

2.2 Intended use

The operation module can only be implemented in accordance with the product description and technical specifications. All relevant safety requirements were met in regards to the development, production, inspection and documentation.

Intended operation

Normally, there should be no danger of damage or injury to personnel or material created by the product when the handling regulation and technical safety instructions are complied to.

The detailed knowledge and correct implementation of the installation guidelines, safety instructions and functions provided in this manual are fundamental to the safety of the system.

Safety concept of the entire facility

It is necessary to know all of the functions and respective safety instructions to integrate them into the safety concept of the entire facility, in order to be able to use the described components, or operation modules, in a host of different ways.

2.3 Special safety instructions

- The safety of the operation module depends on appropriate transportation, appropriate storage, installation and usage.
- Follow the instructions for the mechanical and electrical installation to avoid damage.

Fault-clearing and setup guidelines see chapter „Installation"

- Continue to follow the instructions about fault-clearing and setup guidelines and shielding of cables.

If necessary, switch off the supply voltage of the switch cabinet

- If, during installation of the operation module in the switch cabinet, parts are accessible that are under dangerous contact voltage, switch them off before opening the switch cabinet.
- The operation module must not be turned on if condensation is present, to avoid damage to the electronics. If changing from

a cold to a warm location, the device must be given 2 hours to acclimatise to the new temperature.

- Make sure that the operation module is not covered so that there is enough air circulation for cooling.
- Do not allow the operation module to be in direct sunlight for prolonged periods or to be near places where high temperatures occur (eg. Radiators, Heaters etc.).
- If the maximum permissible ambient temperature is exceeded, you must provide suitable forced ventilation, otherwise the operation module will be damaged.
- Protect the operation module against moisture or rain.
- Only use standard cables with shielding for communication interface connections.
- All plug-connections must be screwed or locked in place.
- Interface cables must not be installed near sources of strong electromagnetic interference.
- No liability will be assumed for malfunction and/or damage caused by usage of self-made cables.
- The frontal IP65 protective rating can only be reached if the operation module is mounted in a professional manner and on a flat and smooth mounting surface.. *See chapter 11 Technical Data*
- The power supply must remain within the stated range.
- Connect the functional earthing of the operation module with the switch cabinet grounding according to chapter 4 „Installation“.
- The operation module‘s keyboard must not be cleaned using an abrasive cleaning agent or a rough cloth. Compressed air and steam jet methods of cleaning are also not permitted. *See chapter 8*

Maintenance

Herkules-Resotec products may only be maintained by Herkules-Resotec Customer Service or authorised personnel or companies. *Important!*

Only original operation module parts or parts from Herkules-Resotec may be used.

- Part replacement may only be undertaken by qualified personnel.
- Standard components, such as fuses, must be dimensioned in accordance with the stated values.

2.4 Used danger symbols

This user guide contains warnings that are designed for your personal safety and to prevent material damage. Warnings pertaining to your personal safety are emphasised with a warning triangle. Warnings pertaining only to material damage are not indicated with a warning triangle.

The specific warnings have the following meanings:

DANGER

Indicates a high-risk immediate hazard which, if not avoided, will result in death or serious injury.

CAUTION

Indicates a potential hazard with medium risk, which can result in death or (serious) bodily harm if not avoided.

ATTENTION

Indicates a low-risk hazard which, if not avoided, could result in minor or moderate personal injury or material damage.

ATTENTION!

without warning
means that property damage can occur if the appropriate precautionary measures are not taken.

WARNING!

means that an unwanted event or condition can occur if the relevant note is ignored.

IMPORTANT!

This symbol gives important information for the proper handling of the machine. Failure to observe this note may result in malfunction of the operating module, machine or environment.

NOTE!

Under this icon you will find application tips and particularly useful information. They help you to make optimum use of all the functions of your operation module.

In the case of multiple danger warnings, the warning of the highest level will be shown.

If a warning triangle warning is warning about personnel safety then it may also be warning about material damage in the same warning.

2.5 Approvals and explanations

2.5.1 CE conformity

All guidelines applicable to the operation modules and their harmonized EN standards are met.

2.5.2 Approvals

All operation modules meet the following standards:

Pos.	Designation	Description / severity level
1	Guideline 2011/65/EU	Restriction of Hazardous Substances
2	EN 61131-2	Programmable controllers - Part 2: Equipment requirements and tests (with limitation of the operating temperature to a maximum of 50 ° C)
3	EN 55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement / Class B without restrictions on sales
4	EN 60529	Protection class of the front panel / IP65. Complete protection against contact, protection against the ingress of dust, protected against water spray

2.5.3 EC declaration of conformity and certificates

The declaration of conformity and a copy of the TÜV certificate can be found on our homepage:

www.herkules-resotec.de

3 Conditions for the operation of the operation module

mounting

The operation modules are designed to be integrated into switchboards or switch cabinets and require the following for trouble-free operation.

control and communication

The operation modules can be integrated into diverse automation systems by means of various communication interfaces.

4 Installation instructions for all operation modules

general installations

This chapter describes all installation step to mechanically install and electrically connect your operation module. Module-specific installations can be found in special chapters.

4.1 Unpacking the operation module

Check the condition of the device!

Unpack the operation module and check first the operation module's condition on arrival.

Check, in particular, that the supplied seal on the operation module is damage-free.

The delivery includes:

- Operation module
- 4 fastening elements
- Operating manual

If you find damaged parts, contact the company Herkules-Resotec GmbH. Do not under any circumstance install damaged components as this could lead to malfunction.

4.2 Mechanical installation

Installation requirements

The operation module can be mounted vertically or at an angle in the front plate of switch cabinet doors, switchboards, operating tables and desks. If not mounted strict vertically, the allowed angle in service is ± 30°.

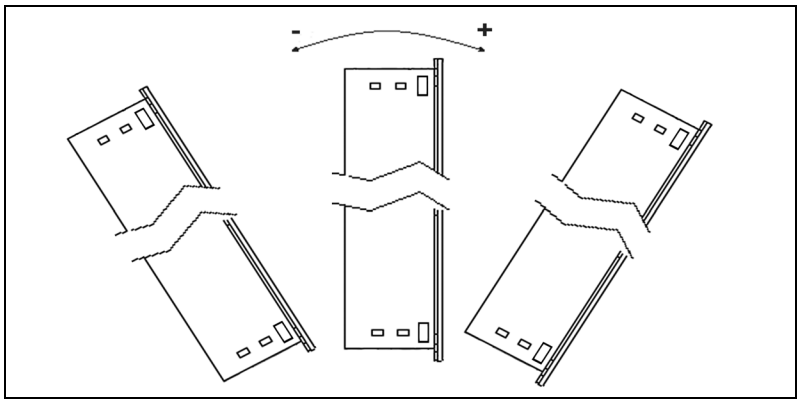


Fig. 4.1: Permissible installation dimensions

OM 2008/2002 horizontal or vertical installation

The OM 2008 and OM 2002 operation modules can be installed vertically or horizontally.

The front plate requires a cut-out before the mounting.
Additional fastening bore holes are not necessary.

Important!

Consider the following points when deciding on the installation location:

- operation module mounting height optimal for ergonomic operation,
- good illumination for reading the labels and recognising the coloured keys,
- the mounting surface must be flat, smooth and not deformable,
- There must be at least 10 mm free space on all sides to ensure adequate heat exchange

exact distances when installing several modules see Fig. 4.2

see technical data

- if the maximum permissible ambient temperature is exceeded, you must provide suitable forced ventilation, otherwise the operation module will be damaged.

The following must be adhered to to ensure the retention of the IP65 protection:

- The material of the installation site must be torsionally rigid.
- The front plate thickness must be between 2 mm and 9 mm.
- The permissible deviation of the flatness at the mounting cutout is ≤ 0,5 mm. A built-in operation module must also meet these requirements.
- The permissible surface roughness around the mounting gasket is ≤ 120 µm (R_z 120).

Make a front panel cutout in the following dimensions:

applies to horizontal installation

Width: 115^{-2} mm

Height: 105^{-2} mm

for vertical installation change dimensions accordingly

Mounting depth: app. 50 mm

Insertion strips for the OM 2008 operation module

If you plan to insert the insertion strips while the operating module is installed, you may use a cutting width of max. 116 mm.

Important!

Plan enough additional space for a sufficient bending radius of the cables connected to the operation module.

If you are mounting several operation modules next to or above or below each other then the following gaps between the individual cut-out walls:

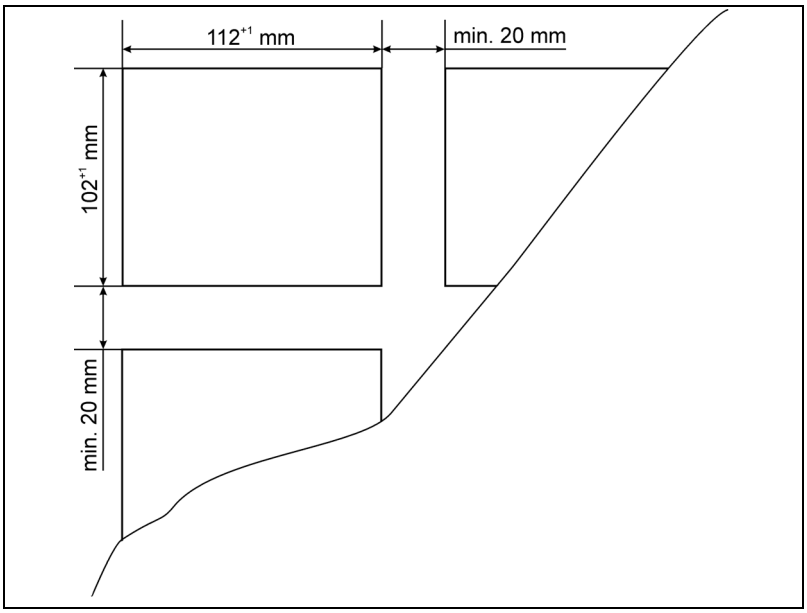


Fig. 4.2: Cut-out scheme for multi OM 2032 board

Take extra consideration of the max. permissible ambient temperature when mounting several operation modules. Ensure a sufficient dissipation of heat during operation.

Consider the ambient temperature!
See technical data

Additional ventilation may be required.

Make sure that the insertion strips are not wedged between mounting cut-out and the operation module's seal.

CAUTION

If the symbol => appears in this manual, you will be prompted to operate. The result of your service is shown in italics..

=> Place the operation module in the cut-out.

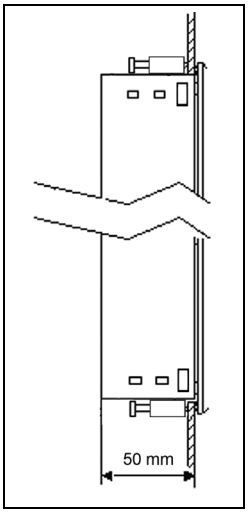
=> Mount the operation module with the fastening elements according to the assembly drawing.

=> Fasten one clamp to each of the corners of the operation module (vertical or horizontal locating bores)..

=> Tighten the screws a little.

=> Control and adjust the position of the display, carefully make sure of the correct positioning over the rubber gasket.

=> Make sure that the rubber gasket of the operation module is completely positioned on the front panel.



=> Tighten the clamp screws to a torque of 0,15 ... 0,20 Nm.

Very important! The front side IP65 protective rating can only be reached when mounted professionally and on a flat and smooth surface.

4.3 Electrical installation

Follow the correct order of electrical connection After you have mounted the operation module according to the guidelines in the operating manual, connect the electrical connections in the following order:

- Connect the functional grounding
- Connect the power supply
- Connect the control system or other communication devices

ATTENTION! Connect only in the stated order, otherwise the Control Module can become damaged.

Note the following:

ATTENTION!

- Only use standard cables with shielding for communication interface connections.
- All plug-connections must be screwed or locked in place!
- Interface cables must not be installed near sources of strong electromagnetic interference!
- No liability will be assumed for malfunction and/or damage caused by usage of self-made cables.
- Ensure that the contact pins are not bent.
- All plug-connector screws are dimensioned to secure against turning.

Information on wire end ferrules, stripping and cable cross section

Nominal cross section 1,5 mm² and stripping length 10 mm

Connection data		
Conductor cross-section	**min**	**max**
stiff	0,2 mm²	1,5 mm²
flexible	0,2 mm²	1,5 mm²
flexible with wire end ferrule without plastic sleeve	0,25 mm²	1,5 mm²
flexible with wire end ferrule with plastic sleeve	0,25 mm²	0,75 mm²
AWG	24	16
AWG acc. to UL/CUL	16	24

4.3.1 Fundamental description to potential equalisation

Potential differences

Differences in potential can occur between spatially divided parts of the facility, which can lead to high equalisation currents in the data cables and destroy the interfaces.
Equalisation currents can occur when cable shielding is grounded at both ends and are grounded at different parts of the facility.
Differences in potential can occur due to multiple different power sources being used.

ATTENTION!

The potential differences must be reduced by installing potential equalisation cables to protect the vulnerable components.

Therefore, note the following:

- The effectiveness of a potential equalisation is higher when the potential equalisation cable's impedance is lower, in other words, when the cross-section of the potential equalisation cable is larger.
- Two parts of a facility that are connected to each other by shielded data cables, grounded at each end of the shielding with a protective-conductor/earth-electrode, may only have an impedance value, of the additionally installed potential equalisation cables, max. 10 % of the shielding impedance.
- The cable cross-section must be dimensioned for the max. possible equalisation current and be made of copper or galvanised steel.
- Connect the potential equalisation cables extensively to the protective-conductor/earth-electrode and protect against corrosion.
- Clamp the data cable shielding extensively with an appropriate ring clamp to the equipotential bonding bar.
- Pay attention that the cable distance between the Control Module and equipotential bonding bar is dimensioned to be as short as possible.
- Install the potential equalisation and data cables parallel to each other and with minimal distance between them.

4.3.2 Pin connection for all OM sub modules

The pin connection is the same for all sub modules.

Pin connection legend:
(1) Functional grounding
(2) Power supply
(3) DIP-switch SW2
(4) Coding switch SW1
(5) Module bus connection
(6) Identification plate
(a) Article number and device designation
(b) the first digits are the serial number, after "_" see the production date with day, month, year

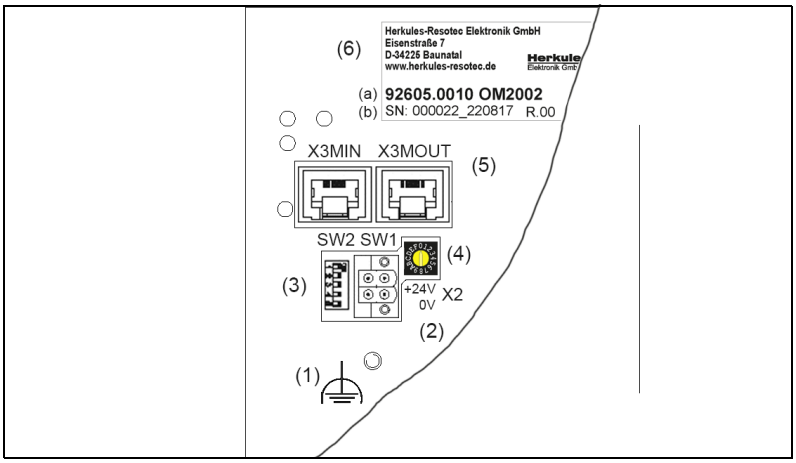


Fig. 4.3: Rear side of the sub module.

4.3.3 Pin connection OM 2008 head modules

Pin connection legend:
(1) Functional grounding
(2) Power supply
(3) DIP-switch SW2
(4) Coding switch SW1
(5) Module bus connection
(6) Identification plate
(a) MAC ID number (only devices with ETHERNET IP or PROFINET)
(b) Article number and device designation
(c) the first digits are the serial number, after "_" see the production date with day, month, year
(7) PLC connection
(8) Profibus address switch SW 3 (only for Profibus connection)

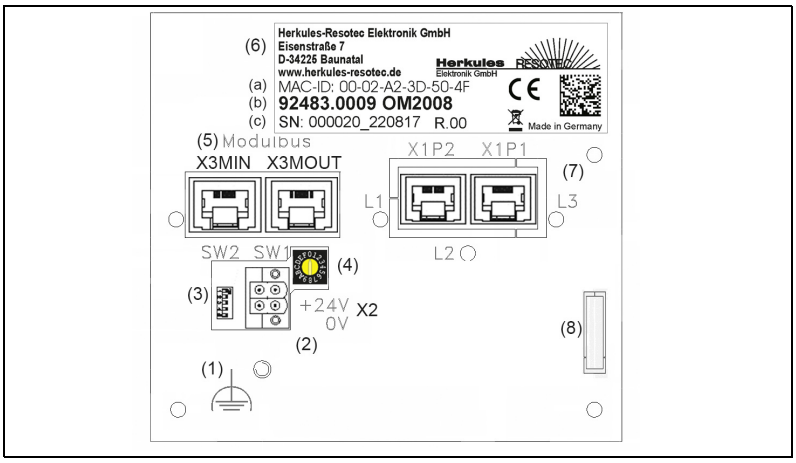


Fig. 4.4: The rear side of the OM 2008 head module.

4.3.4 Functional grounding connection

Functional grounding (1)

- The functional grounding of the operation module must be installed according to the DIN VDE 0100 norming standard and must only be installed by qualified personnel.

=> Connect to the functional grounding to the marked grounding points (1) on the reverse side of the operation module.

WARNING!

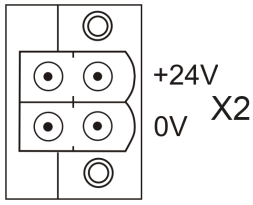
Cable shields are not suitable for functional grounding.
Interface modules can be damaged or destroyed if the cable for functional earthing does not have the required minimum cross-section of 4 mm².

4.3.5 Connecting the power supply

=> The cable for the voltage supply is connected to the connector pin strip. The provided four-pole clamping connector should be used.

- A 24V voltage supply must be equipped with a secure electrical disconnection of the low voltage.

Voltage supply (2)



For the DC 24 V supply, only use power supplies with safe electrical isolation according to IEC 364-4-41 or HD 384.04.41 (VDE 0100, part 410), e.g. according to the standards SELV (Safety Extra Low Voltage) and PELV (Protective Extra Low Voltage).

The power supply must only be within the specified voltage range of 24 V (-15 % / +20 %). Otherwise, function failures on the operation module cannot be ruled out.

Applies to potential-bound system design (PELV):

From the DC 24 V output of the power supply, connect the connection for GND 24 V to the equipotential bonding for a uniform reference potential. Select a connection point that is as central as possible.

ATTENTION

4.3.6 DIP-Switch SW2

The DIP-Switch SW2 switches the bus termination and is used to change the mode.

DIP-Switch SW2 (3)

The DIP-Switch SW2 switch number is depicted after a decimal point in the following guidelines. For the adjacent picture that would mean: SW2.1 - ON, SW2.2 - ON, SW2.3 - ON, SW2.4 - OFF und SW2.5 - OFF.

The switch settings should be set as follows:

SW2.1- ON:	120 Ω Bus termination (only set to "ON" on the head module and the last sub module. All other modules inbetween the bus set to "OFF" (see Fig. 4.5).
SW2.2 - SW2.4:	Depends on the connected communication module.
SW2.5 - ON:	compatible mode (LED red, green and status)
SW2.5 - OFF:	Standard mode (LED red, green, blue, yellow, white and status)

only valid for the head module and the last sub module (see Fig. 4.5)

4.3.7 Coding switch SW1

The coding switch SW1 is used to set the slave address of the sub-sub Modules (1 to 7).

Coding switch SW1 (4)

The coding switch SW1 has the following special settings:

- **Position A,B, C, D:**
  not used
- **Position 0:**
  head module

- **Position 1 to 7:**
  sub modules 1 to 7 (see Fig. 4.5)
- **Position 8 and 9:**
  not used

Position C, E and F

There are still the following positions.

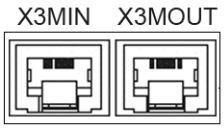
C: see chapter 4.5 „Factoring default“ and

E and F: see chapter 4.6 „Offline test“

4.3.8 Connecting the module bus

RESOTEC module bus connection (5)

=> Connect the operation modules as sub modules for the local substructure to the module bus connection, as shown in Fig. 4.5.



=> Set the DIP-switch SW2.1 (3) according to Fig.4.5.

=> Set the coding switch SW1 (4) according to Fig.4.5.

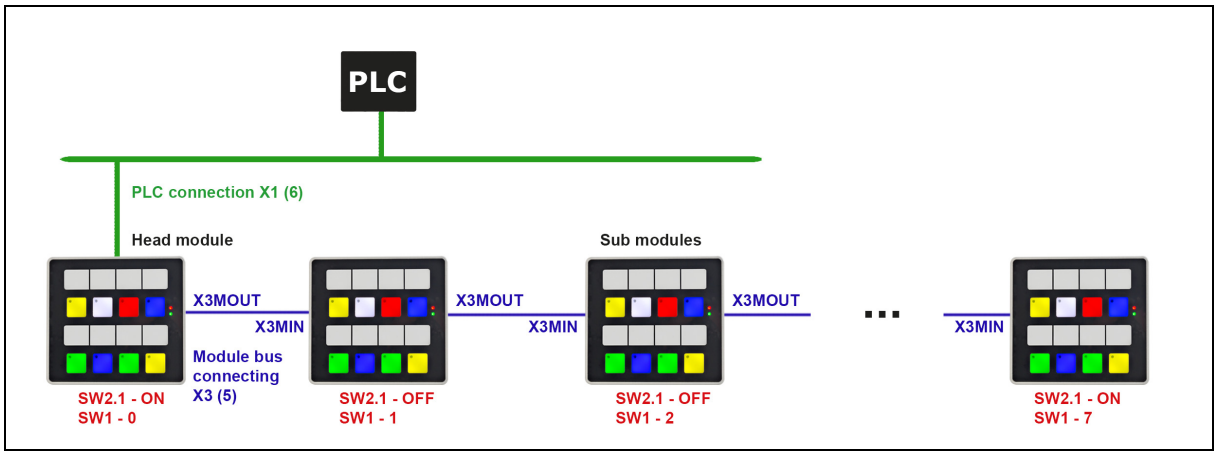


Fig. 4.5: Connection of the sub modules. The maximum cable length for the module bus is 9 m.

4.3.9 Connection PLC

As you can see in fig. 4.5, the head module is connected directly to the control

The socket for the control connection varies depending on the connection type, e.g. PROFIBUS or Modbus (see chap. 4.3.9.1 to 4.3.9.3)

4.3.9.1 PROFINET I/O and Ethernet/IP connection

applies to PROFINET and Ethernet/IP

The connection and the meaning of the LED on the network connector are identical for PROFINET and for Ethernet/IP.

NOTE!

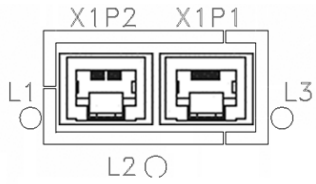
- Use only standard network cables for the connection.

=> Connect the network cable (PROFINET I/O and Ethernet/IP) of your PLC to the PLC connection.

The three LEDs on the network connector are used for internal diagrose and have the following meaning:

PLC connection (7)

L1
indicates the communication status 1.



L2
indicates the module status RUN/READY, that means:

LED yellow lights up	Boot loader netX (= romloader) waits for second stage boot loader.
LED flashes green/ yellow:	Second stage bootloader is waiting for firmware
LED green:	Operating system working
LED is not lit:	The power supply for the operation module is not connected or the hardware is defective.

L3
indicates communication status 2

Error-free operating status of the LED:

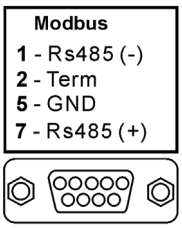
L2	lights up green
L1 and L3	light up weakly green

4.3.9.2 Modbus connection

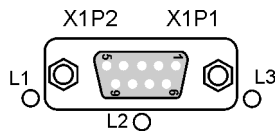
PLC connection Modbus (7)

The Modbus connection has the opposite assignment.

A bridge between pin 1 and 2 switches on the 120 Ohm bus termination.



PLC connection PROFIBUS (7)

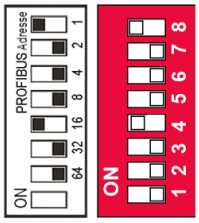


4.3.9.3 PROFIBUS-DP connection

The PROFIBUS connection is assigned as follows:

X1		
PIN	Signal name	Designation
1	-	
2	-	
3	RxD/TxD-P	Data line Plus
4	CNTR-P	Repeater direction control
5	DGND	Data ground
6	VP	+5 V supply bus termination
7	-	
8	RxD/TxD-N	Data line minus
9	CNTR-N	Repeater directional control

Profibus address switch (8)



Switch for setting the PROFIBUS target address

The adjacent DIP switch (8) is located on the back of the OM 2008. You must use this switch to set the PROFIBUS target address after you have parameterized the adjustment module using the TIA Portal software and determined the address.

Further information in chapter 6.4 „PROFIBUS integration“.

4.4 Key assignment and LED control

4.4.1 LED control and bit combination

Depending on the module, the operation modules have buttons and rotary pulse encoders.

The keys and rotary pulse encoder are read in cyclically at 200 Hz. The LEDs are activated every 10 ms.

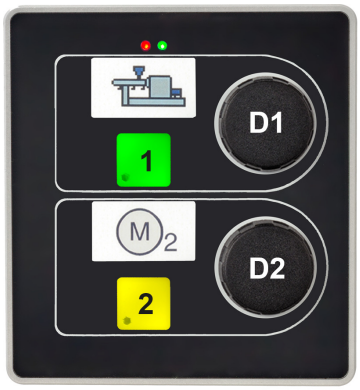
Each button has a red status LED and RGB LEDs for button illumination. The RGB LEDs are operated with the following bit combinations. With all other combinations the button illumination is off.

The following table applies to all operation modules.

Bit Red x	Bit Green x	Bit Blue x	LED Control
1	0	0	Red
0	1	0	Green
0	0	1	Blue
1	1	0	Yellow
1	1	1	White

4.4.2 OM 2002

The OM 2002 operation module has two keys with LED RGB key illumination and status LED, as well as two rotary pulse encoders.



PLC process image of the PLC "input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	x	x	x	x	x	x	**2**	**1**	Key
01	x	x	x	x	x	x	**D2**	**D1**	Rotary pulse encoder
02	0-255								Value encoder D1
03	0-255								Value encoder D2

The rotary pulse encoders operate as 8-bit up/down counters. Counter overflow and counter underflow is not evaluated by the operation module.

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, red
01	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, green
02	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, blue
03	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, status

4.4.3 OM 2008

The OM 2008 operation module has eight keys with LED RGB key illumination and status LED.

PLC process image of the controller "Input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	Keys

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, red
01	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, green
02	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, blue
03	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, status

4.5 Factoring default

A factoring default is only useful for a master module. *only for the master module*
To that:

=> Disconnect the power supply.

=> Turn the coding switch SW1 to C.

=> Switch on the power supply.
The red LED on the front of the device flashes three times, after a short break it flashes again three times, etc.

=> Switch off the power supply.

=> Turn the coding switch SW1 back to 0 and switch on the power supply.

4.6 Offline test

- **Position F:** *SW1 (4) position F*
  The input and display options are demonstrated in this mode. Set the rotary switch to "F" and restart your operation module. The operation module is now in offline test. Pressing keys changes the colours of the keys. The control LED illuminates as long as the key is pressed.
- **Position E:** *SW1 (4) position E*
  The operation module group can be tested in this mode. Pressing a key on one of the Sub Modules will illuminate an LED on the head module. Pressing a key on the head module will show on the sub modules.
  The head module is programmed in the following way:
  Set the rotary switch SW1 on the Head Module to "E". The sub modules must be set according to the specifications in chapter 4.3.8.
  The display is the same on all operation modules.

Status:

The module online status is indicated by the status LEDs in the keys.

- Status-LED key 1 - operation module 0 (Head modul, always on)
- Status LED key 2 - operation module 1
- :
- Status LED key 8 - operation module 7

Testing the keys:

The keys are mapped via the red LEDs (outputs).

- Red LED key 1 - key 1 (input 1)
- Red LED key 2 - key 2 (input 2)
- :
- Red LED key 8 - key 8 (input 8)

Testing the keys of the rotary pulse encoder:

The buttons of the rotary pulse encoder are represented by the green LEDs.

- Green LED key 1 - rotary pulse encoder 1 pressed.
- Green LED key 2 - rotary pulse encoder 2 pressed.

Test of the rotary pulse encoder:

The turning of the rotary pulse encoder is represented by color changes.

- LEDs key 1 - rotary pulse encoder 1
- LEDs key 2 - rotary pulse encoder 2

4.7 Creating insertion stripes

You have the option to label the keys according to the project. Create insertion stripes with the following dimension:

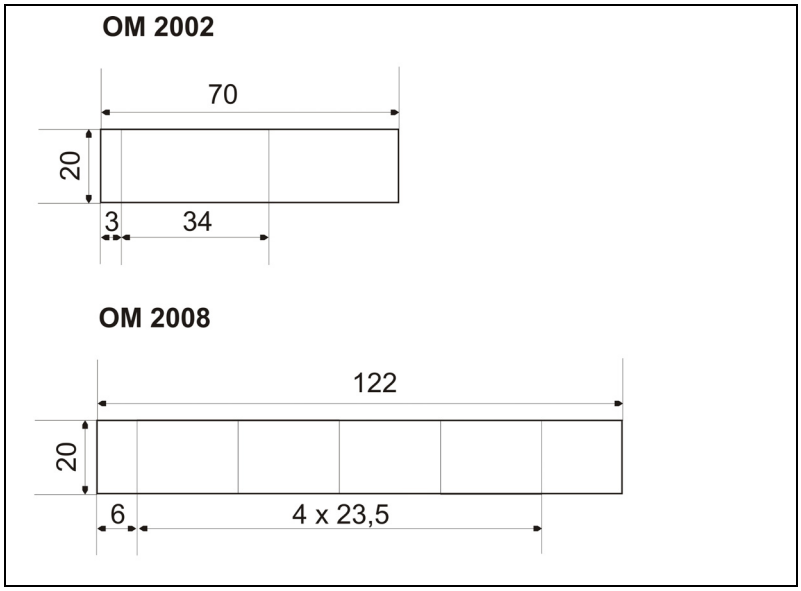


Fig. 4.5: Insertion stripes dimensions

You can insert the insertion stripes in the installed condition, as long as the front material is < 3.5mm thick. If the material is thicker then the operating module must be demounted.

=> Give the template a name and then print out the label.

Respect the material thickness of the label insertion stripes.

Make sure that the chosen insertion stripe label material is rigid enough. This is necessary for the insertion of the stripes. The max. permissible thickness of the label insertion stripe is 0.15mm.

=> Cut out the label insertion stripe.

=> Cut the edges of the label insertion stripe for easy insertion.

=> Remove the old label stripe if applicable.

=> Insert the new label insertion stripe until it is fully inserted.
The label will stick out of the end of the insertion sheath by about 4 cm.

A fixing of the label insertion stripe is not necessary.

5 Commissioning

5.1 Warning notice

ATTENTION

- Commissioning and service work may only be carried out by qualified electrical personnel with relevant accident protection qualifications and in compliance with the applicable regulations.
- The device must have be at room temperature before installation commences. In case of thawing, the device must be left to dry before it is turned on.
- To prevent overheating of the device during operation, it must not be placed in direct sunlight and the ventilation slits must not be covered.

5.2 Steps to commissioning

If the symbol => appears in this manual, you will be prompted to operate. The result of your service is shown in italics...

=> First inspect the electrical and mechanical installation.

=> Make sure in particular that the cable layout and shielding is correct.

=> Check the switch position of the operation module.

The operation module is now ready for operation.

5.3 Operation module start-up

=> Turn on the power supply.
The ON LED (green) and the ERR LED (red) light up. The outputs are off.

All key LEDs are illuminated in white one after the other and switched off again.

Now the ON-LED (green) lights up, the ERR-LED (red) flashes.
The operation module is ready for operation and is waiting for communication with the PLC.

If the operation module does not start, the wiring may not be correct. Check the electrical installation.

Behaviour in case of communication errors or faulty data:

The key LEDs are switched off.

A table for error diagnosis can be found in chapter 7, "LED Error Diagnosis".

6 Control integration

6.1 PROFINET I/O®

TIA Portal is a registered trademark of SIEMENS AG

The configuration of the operation modules is described using the project engineering tool TIA Portal as an example. Only the steps that are specific to the OM modules are explained.

only TIA Portal-trained staff

For basic information and further descriptions, refer to the TIA manual. We assume that only trained personnel who are familiar with the TIA Portal will configure the operation modules.

6.1.1 Installing the GSDML file

Install GSDML file

If not yet performed, the valid GSDML file, e.g. „GSDML-V2.32-RESOTEC-0303-OM2008-20171009“ for the operation module must first be installed in TIA Portal. Thereby:

V2.32 GSDML Version
20171009 Version of the GSDML file "Year Month Day“

The GSDML file is available on the CD or can be downloaded from our website.

6.1.2 Assigning IP adress and device name

see TIA manual

The operation module can be found, designated an IP address and given a device name, through eg. TIA Portal, as soon as you have installed it in the PROFINET network.

6.1.3 Parameterization of the OM modules

To operate the operation module, you must perform parameterization steps in TIA Portal and on the operation module.

first parameterization for all OM operation modules

Since you must select your desired operation module in TIA Portal for parameterization, the software then only displays the input options for this operation module type.

The description of the parameterization therefore applies to all operation module types in the first chapters. Speziellen Parametrierungsmöglichkeiten folgen danach in Extrakapiteln. Then the special parameterization options are described in extra chapters.

Same parameterization for head module OM 2008 and sub module

6.1.3.1 Key numbering of the operation modules

The OM 2008 operation module has 8 keys with LED RGB key illumination and a status LED in each key. It can be used as a head module or sub module. The parameterization is the same for both module types.

The OM 2002 has two keys with LED-RGB key illumination and in each key a status LED and two rotary pulse encoders.

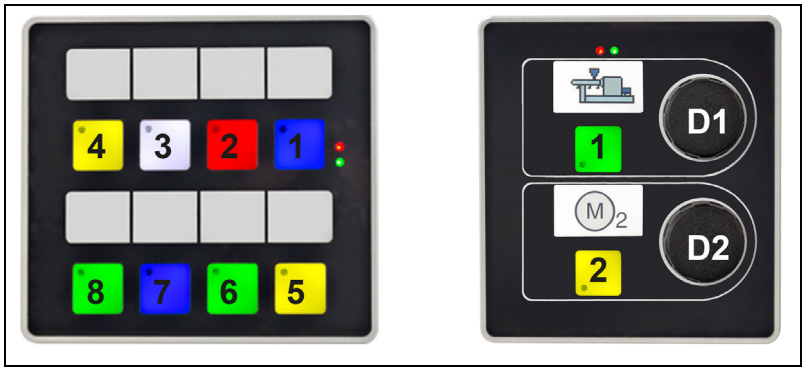


Fig. 6.1: Operation module OM 2008 and OM 2002 with numbering of keys and rotary pulse encoder

6.1.3.2 Integrating of the modules into the PROFINET network (for example OM 2008)

In order to properly parameterize an operation module, you must have detailed knowledge of the TIA Portal project engineering tool. This chapter only describes the parameter settings specific to the operation module.

Basic information and further descriptions must be obtained from the TIA manual.

The parameterization of the operation modules is explained using the example of an OM 2008. For the OM 2002 the parameterization is the same

Special parameter settings are described in later chapters..

=> Select the desired operation module in the hardware catalog (1) and drag it into the work area (2).
A symbol image of the operation module appears in (2).

If the symbol => appears in this manual, you will be prompted to operate. The result of your service is shown in italics..

=> Connect the operation module e.g. to the PLC (here green connecting line).
The connection is drawn in (2).

Information about the selected object is displayed in area (5).

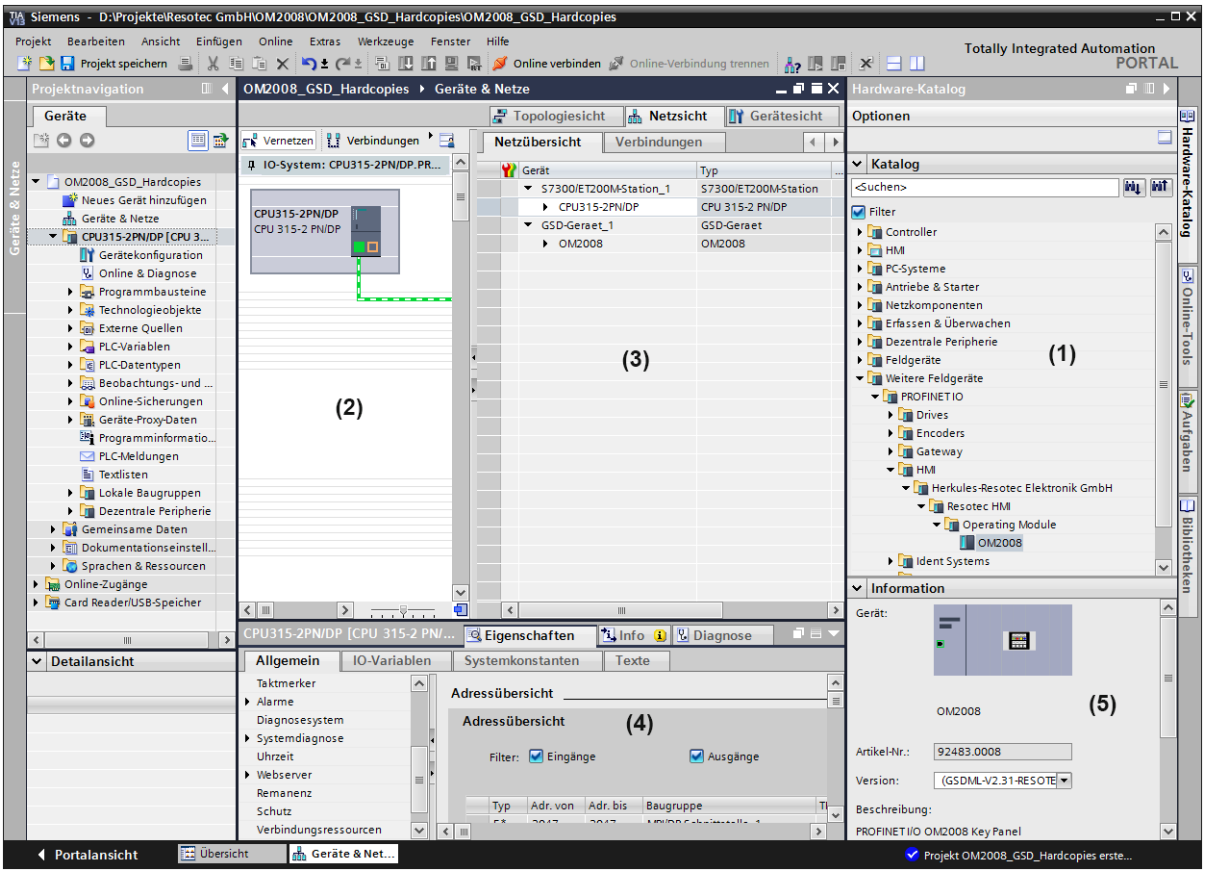


Fig. 6.2: Project view (example)

=> Click on the tab "Device overview".
The device overview (Fig.6.3) appears.

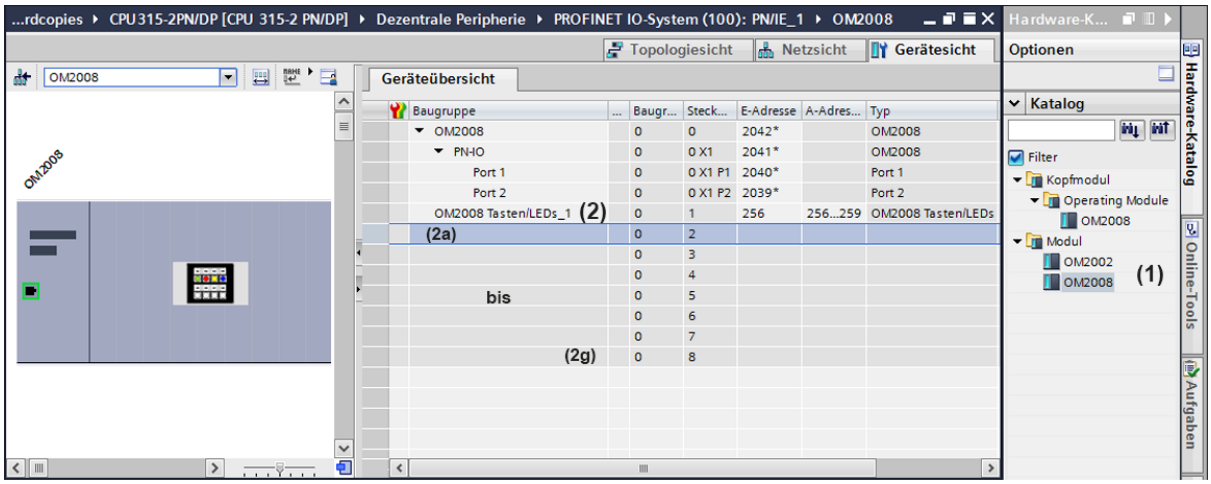


Fig. 6.3: Device overview head module connection

The operation module selected from the hardware catalog (1) (in Fig. 6.3 it is a head module) is displayed in area (2).

If the selected operation module is a head module, the 7 possible sub-modules can be added to the lines (2a) to (2g).

=> Select the desired operation module in the hardware catalog (1) and drag it to line (2a).
It is displayed in the line.

=> Proceed in the same way with the max. 6 further sub-modules.

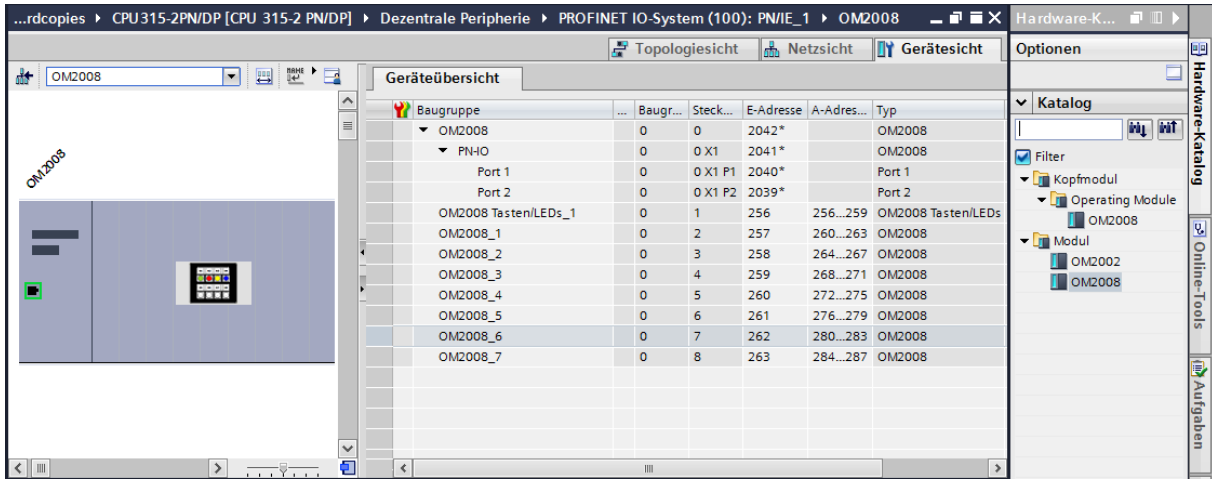


Fig. 6.4: Device overview with one head module and the max. 7 possible sub-modules

6.1.3.3 LED control and bit combination with PROFINET

The keys and inputs are read in cyclically with 200 Hz. The LEDs and outputs are actuated every 10 ms.

Each key has a red status LED and RGB LEDs for key illumination. The following bit combinations are used to control the RGB LEDs. For all other combinations, the key illumination is switched off.

Bit red x	Bit green x	Bit blue x	LED control
1	0	0	red
0	1	0	green
0	0	1	blue
1	1	0	yellow
1	1	1	white

OM 2008

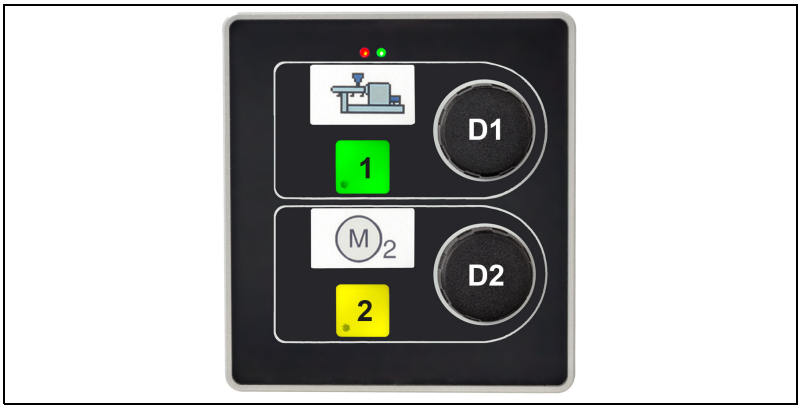
The OM 2008 operation module has 8 keys with LED RGB key illumination and a status LED in each key.

PLC process image of the controller "Input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	Keys

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, red
01	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, green
02	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, blue
03	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, status

OM 2002

The OM 2002 operation module has two keys with LED RGB key illumination and status LED, as well as two rotary pulse encoders.



PLC process image of the PLC "input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	x	x	x	x	x	x	**2**	**1**	Key
01	x	x	x	x	x	x	**D2**	**D1**	Rotary pulse encoder
02	0-255								Value encoder D1
03	0-255								Value encoder D2

The rotary pulse encoders operate as 8-bit up/down counters. Counter overflow and counter underflow is not evaluated by the operation module.

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, red
01	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, green
02	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, blue
03	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, status

6.1.3.4 Parameterization of the LED and the keys

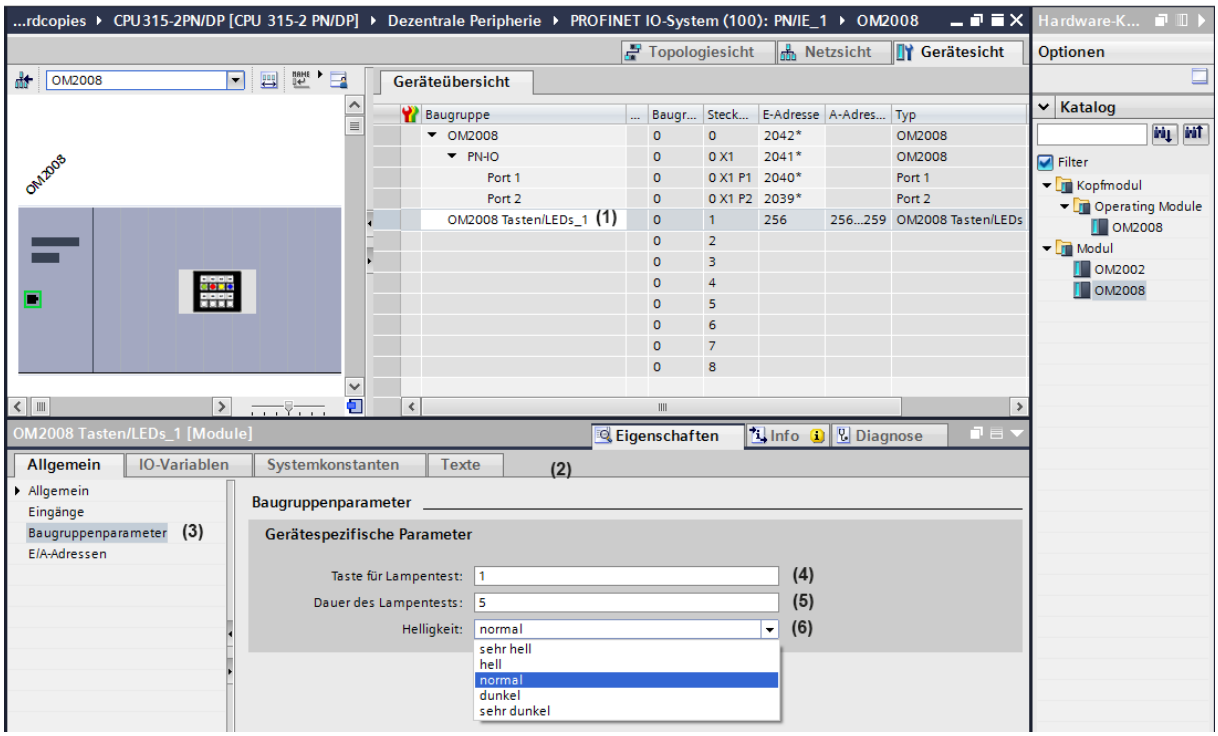


Abb. 6.5: Selection of the LED brightness

=> To parameterize the lamp test and the brightness of the LED, click in the line (1) and in the inspector window (2) on "Module parameters" (3).
The selections "Device-specific parameters" are opened.

=> To parameterize the lamp test, click in the line "Light test key" (4) and "Light test duration" (5).

The following parameters can be set:

- „Light test key“:
  Here you select the number of the desired key. You can set between 0 and 8, where 0 means that no key is used for the lamp test.
- „Light test duration“:
  A value range of 0...60 s can be set. Value "0" means no lamp test. The default setting is 5 s.

=> To change the brightness of the LED, click in line "Brightness" (6)

Adjustable is: very bright, bright, medium, dark or very dark. The default setting is "medium".

6.2 Modbus®

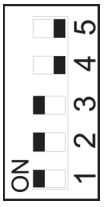
6.2.1 Necessary settings switch SW2 and SW1

Description of the switches see chapter 4.3

For Modbus integration you first have to set the DIP switch SW2 and the coding switch SW1.
Both switches are located on the back of the operation module.

Setting the baud rate at switch SW2

DIP switch SW2



With SW2.4 and SW2.3 you set the baud rate. The border is always 8 data bits, no parity and 1 stop bit..

SW2.4 - OFF;	SW2.3 - OFF	9600 baud
SW2.4 - OFF;	SW2.3 - ON	19200 baud
SW2.4 - ON;	SW2.3 - OFF	38400 baud
SW2.4 - ON;	SW2.3 - ON	57600 baud

Settings of the slave address head module OM 2008 at switch SW1

Coding switch SW1

Stellen Sie den Schalter wie folgt ein:

- **Position 0 + 1:**
  Modbus slave address 1
- **Position 2-9:**
  Modbus slave address 2 to 9

6.2.2 Status information

Applies to all: reading with function code 3

Supported function codes:
3 reading registers
16 writing registers
23 writing registers / reading registers

Online status

Online status (1 = module online, 0 = module offline)																	
Word address	**Bit 15**	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**	**Meaning**
164	X	X	X	X	X	X	X	X	8	7	6	5	4	3	2	1	module

Module types:
Address: 165 - 172 (8 words)
Address 165 = Head module

Address 164-172 = Sub module 1to 7

Type	
Address	**Meaning**
165 ... 172	Type module 1 = OM 200 2 = OM 100 9 = OM 2008 10 = OM 2002

Error status: Sub module 1 to 7
Address: 174 - 180 (7 words)

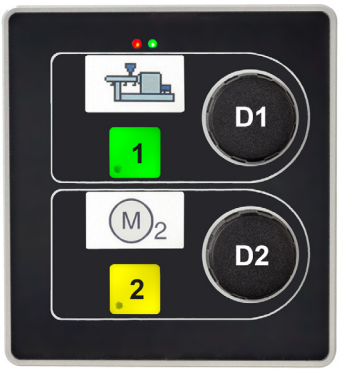
Module status	
Address	**Meaning**
174 ... 180	Error status:: 0 = module ok 1 = module address twice

Version:
Address: 181 - 196 (8 words)
Address 181 = Head module

Version			
Word Offset	**Byte Offset**		**Meaning**
0	0	X	Main software version module 0
	1	X	Secondary software version module 0
1	2	X	Software output module 0
	3	not used	

6.2.3 Rotary pulse encoder assignment OM 2002

The OM 2002 operation module has two keys with LED RGB key illumination and status LED, as well as two rotary pulse encoders.



The following applies to the input keys:
Address: 100 - 115 (16 words) for each module 2 words
Address: 100 = Head module

PLC process image of the PLC "input area“ (reading with function code 3 or function code 23)										
Word offset	**Byte offset**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**	
0	0	x	x	x	x	x	x	**2**	**1**	Key
	1	x	x	x	x	x	x	**D2**	**D1**	Rotary pulse encoder
1	0	0-255								Value encoder D1
	1	0-255								Value encoder D2

The following applies to the output LEDs:
Address: 132 - 155 (24 words) for each module 3 words.
Address 132 = Head module.

The rotary pulse encoders operate as 8-bit up/down counters. Counter overflow and counter underflow is not evaluated by the operation module.

PLC process image of the controller "output area“ (writing with function code 16 or 23)										
Word offset	**Byte offset**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**	LED control
0	0	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, red
	1	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, green
1	0	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, blue
	1	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, status
2	0	x	x	x	x	x	x	2	1	LED flashing (RGB)
	1	x	x	x	x	x	x	2	1	LED flashing (RGB)

Example for flashing control Modbus connection of key 1					
Word offset	**Byte offset**	**Bit states**			
2	0 Bit 0	0	1	0	1
	1 Bit 0	0	0	1	1
Control		No flashing	Flashing 0,5 Hz	Flashing 1 Hz	Flashing 2 Hz

6.2.4 Key assignment OM 2008

The OM 2008 operation module has 8 keys with LED RGB key illumination and a status LED in each key.

The following applies to the input keys:
Address: 100 - 115 (16 words) for each module 2 words
Address 100 = Head module

Input keys module 0-7, 4 byte input per module (reading with function code 3 or function code 23)										
Word offset	**Byte offset**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**	**LED control**
0	0	8	7	6	5	4	3	2	1	Key
	1	not used								
1	0	not used								
	1	not used								

The following applies to the output LEDs:
Address 132 - 155: (24 words) for each module 3 words.
Address 132 = Head module

Output LEDs module 0-7, 6 byte LED output per module (writing with function code 16 or 23)										
Word offset	**Byte offset**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**	**LED control**
0	0	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**LED red**
	1	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**LED green**
1	0	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**LED blue**
	1	8	7	6	5	4	3	2	1	LED status
2	0	8	7	6	5	4	3	2	1	LED flashing (RGB)
	1	8	7	6	5	4	3	2	1	LED flashing (RGB)

Example for flashing control Modbus connection of key 1					
Word offset	**Byte offset**	**Bit states**			
2	0 Bit 0	0	1	0	1
	1 Bit 0	0	0	1	1
Control		No flashing	Flashing 0,5 Hz	Flashing 1 Hz	Flashing 2 Hz

6.3 PROFIBUS®

TIA Portal is a registered trademark of SIEMENS AG

The configuration of the operation modules is described using the project engineering tool TIA Portal as an example. Only the steps that are specific to the OM modules are explained.

only TIA Portal-trained personnel

For basic information and further descriptions, refer to the TIA manual. We assume that only trained personnel who are familiar with the TIA Portal will configure the operation modules.

6.3.1 Installing the GSD file

Install GSD file

If not yet executed, the valid GSD file, e.g. „OM_92483.gsd“ must be installed for the adjustment module in TIA Portal.

The GSD file can be found on the CD or downloaded from our website.

6.3.2 Parameterization of the modules

To operate the operation module, you must perform parameterization steps in TIA Portal and on the operation module.

IMPORTANT!

In order to operate the operation module in standard mode, the DIP switch SW2.5 must be set to OFF. If you need the compatible mode, the DIP switch SW2.5 must be set to ON (see chapter 4.3.6).

first parameterization for all OM operation modules

Since you must select your desired operation module in TIA Portal for parameterization, the software then only displays the input options for this operation module type.

6.3.2.1 Key numbering of the operation modules

Same parameterization for head module OM 2008 and sub module

The OM 2008 operation module has 8 keys with LED RGB key illumination and a status LED in each key. It can be used as a head module or sub module.

The OM 2002 has two keys with LED-RGB key illumination and in each key a status LED and two rotary pulse encoders

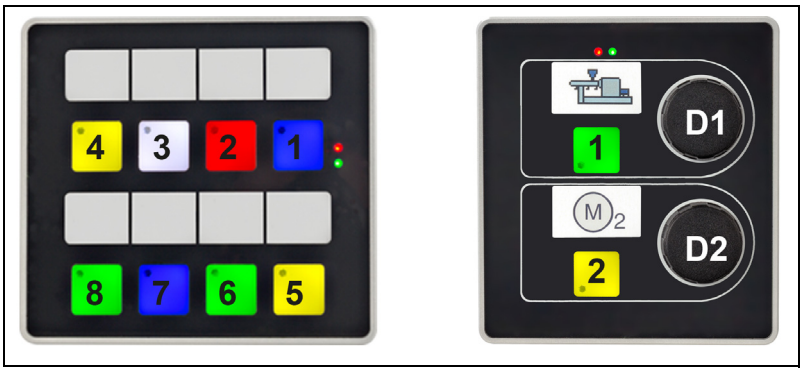


Abb. 6.6: Operation module OM 2008 and OM 2002 with numbering of keys and rotary pulse encoder.

6.3.2.2 Configuration of modules into the PROFIBUS network

Basic information and further descriptions must be obtained from the TIA manual.

In order to properly parameterize an operation module, you must have detailed knowledge of the TIA Portal project engineering tool. This chapter only describes the parameter settings specific to the operation module.

=> Select the desired operation module in the hardware catalog (1) and drag it into the work area (2).
A symbol picture of the operating module appears in (2).

=> Connect the operation module e.g. with the control (here red connection line).
The connection is drawn in (2).

In area (3) information about the selected object is displayed.

Each module always occupies 4 bytes, i.e. 32 bytes in/out for 8 modules.

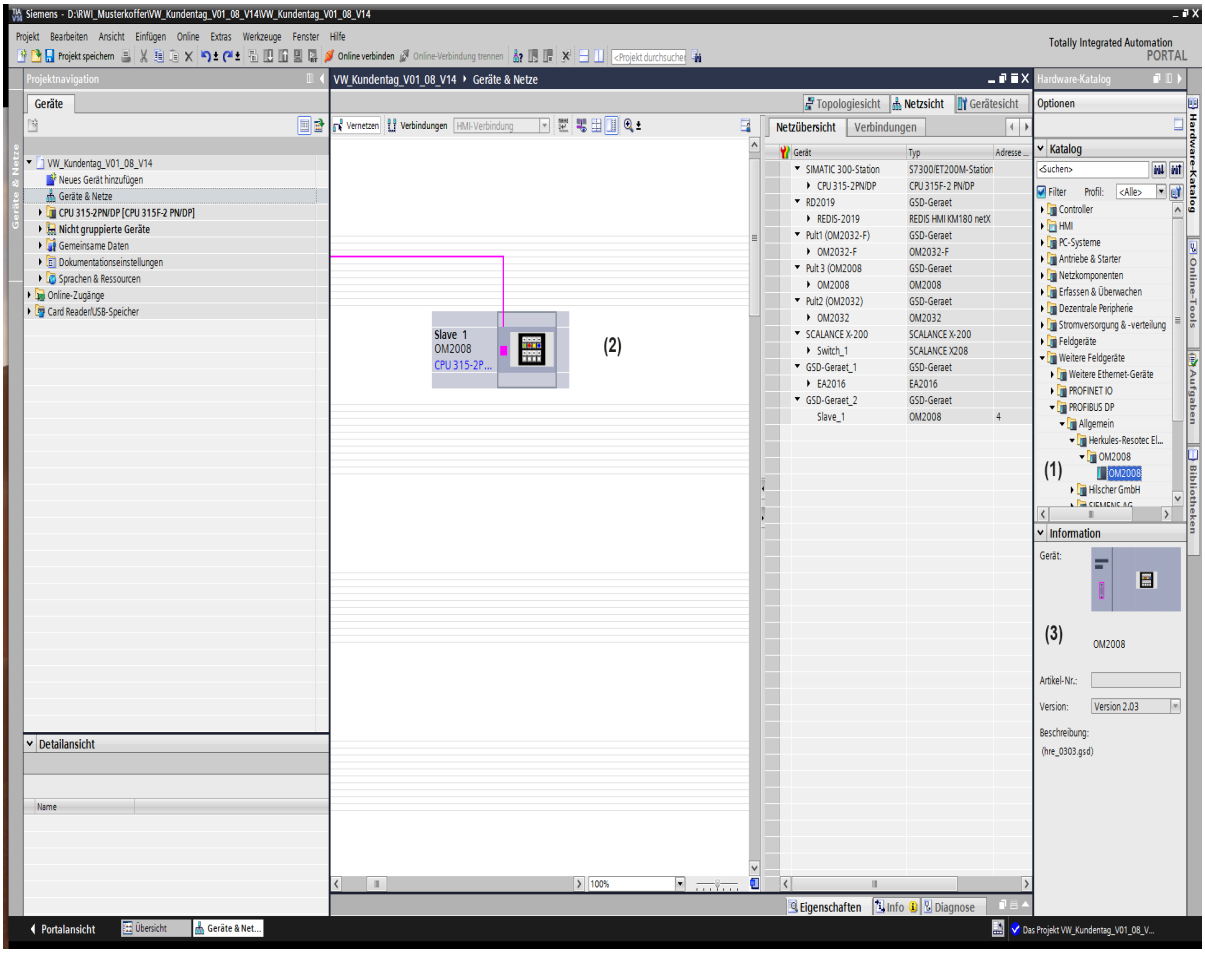


Fig. 6.7: Project view (example)

6.3.2.3 LED control and bit combination of modules with PROFIBUS

The keys and inputs are read in cyclically with 200 Hz. The LEDs and outputs are actuated every 10 ms.

Each key has a red status LED and RGB LEDs for key illumination. The following bit combinations are used to control the RGB LEDs. For all other combinations, the key illumination is switched off.

Bit red x	Bit green x	Bit blue x	LED control
1	0	0	red
0	1	0	green
0	0	1	bue
1	1	0	yellow
1	1	1	white

OM 2008

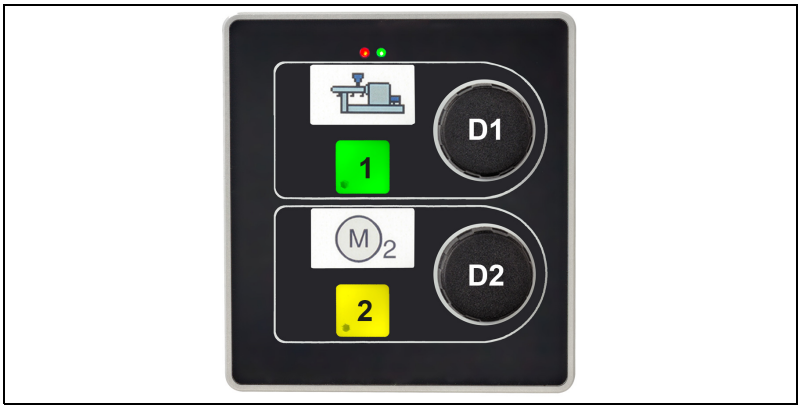
The OM 2008 operation module has 8 keys with LED RGB key illumination and a status LED in each key.

PLC process image of the controller "Input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	Keys
01									
02									
03									

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, red
01	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, green
02	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, blue
03	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, status

OM 2002

The OM 2002 operation module has two keys with LED RGB key illumination and status LED, as well as two rotary pulse encoders.



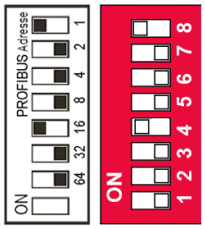
PLC process image of the PLC "input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	x	x	x	x	x	x	**2**	**1**	Key
01	x	x	x	x	x	x	**D2**	**D1**	Rotary pulse encoder
02	0-255								Value encoder D1
03	0-255								Value encoder D2

The rotary pulse encoders operate as 8-bit up/down counters. Counter overflow and counter underflow is not evaluated by the operation module.

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, red
01	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, green
02	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, blue
03	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, status

6.3.2.4 Setting the PROFIBUS slave address

PROFIBUS address switch



On the back of the OM 2008 you will find the DIP switch shown on the side, which you must use to set the PROFIBUS slave address after you have parameterized the operation module using the TIA Portal software and determined the address.
Next to the switch there is a sign indicating the value of the switch.

As an example the opposite switch position with the address 1 + 16 = 17.

6.4 Ethernet/IP®

The integration of the operation modules is described using a DHCP server (e.g. BOOTP/DHCP Server 2.3). Only the specific functions for the OM modules are decribed.

For basic information and further descriptions, refer to the Studio 5000 manuals. We assume that only trained personnel who are familiar with the Studio 5000 will configure the operation modules.

6.4.1 Installing the EDS file

=> Install the EDS file "OM2008_92483.EDS" in your PLC programming software to configure your Ethernet/IP network.

For the input address and the output address of the module 2 bytes each are configured. The assignment of the individual keys and LEDs to the corresponding bit address is made according to the table in chapter 6.4.5.

Important! We recommend that you perform a "Factoring default" before setting the IP address.

see chapter 4.5

6.4.2 Setting the IP address via DHCP mode

To set the IP address of the module, you need a DHCP server (e.g. BOOTP/DHCP Server 2.3). In delivery state, the DHCP mode is active and the system waits for the assignment of an IP address.

DHCP-Server necessary

=> Connect your module to your PC by using an Ethernet cable.

=> Start the DHCP program.

Status of LED	Meaning	Status module
LED 1 flashes LED 2 on LED 3 off	System is booted up, waiting for IP address	System starts without stored IP address in DHCP mode or BOOTP

The following window appears:

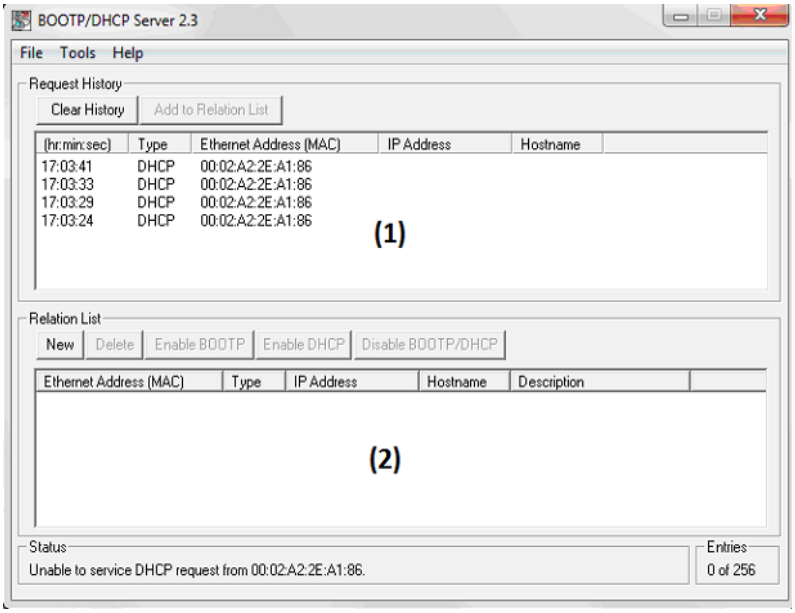


Fig. 6.8: Selection of the module

=> Select your desired module from the list (1) "Request History" (Fig. 6.6) by double-clicking it.
The "New Entry" window appears.

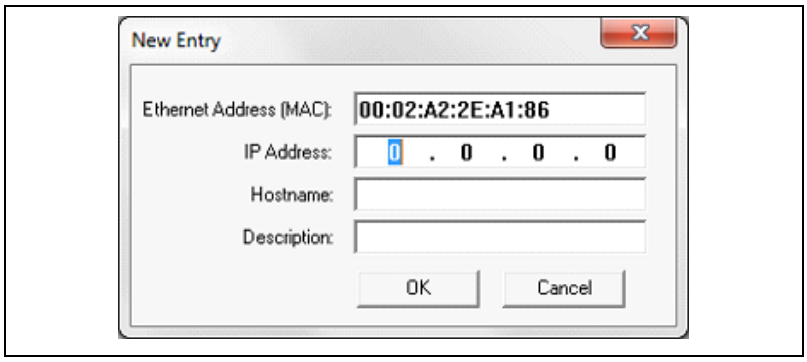


Fig. 6.9: "New Entry" window before entering the IP address

=> Enter the IP address of your module under "IP Address", e.g. 192.168.192.30, and select "OK"..

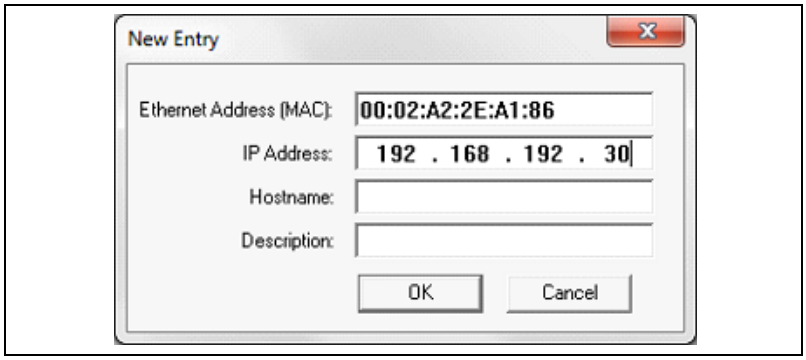


Fig. 6.10: "New Entry" window after entering the IP address

After closing the New Entry window, the DHCP server window appears again (Fig. 6.6). In list (1) (Request History) and list (2) (Relation List) the module with the assigned IP address appears. LED 1 (back of module) is on.

Status of LED	Meaning	Status module
LED 1 on LED 2 on LED 3 flashes green	The IP address specified via DHCP or BOOTP mode is active	System has an IP address
L1 on L2 on L3 on	System is started up and communication is active	System has an IP address

Status of LED	Meaning	Status module
L1 on L2 on L3 flashes red	System has been started up and has a communication error	The communication to the PLC is interrupted (e.g. cable, network configuration, PLC).

6.4.3 Save configuration

To save the configuration of the IP address, the BOOTP mode or DHCP mode must be switched off in the module.

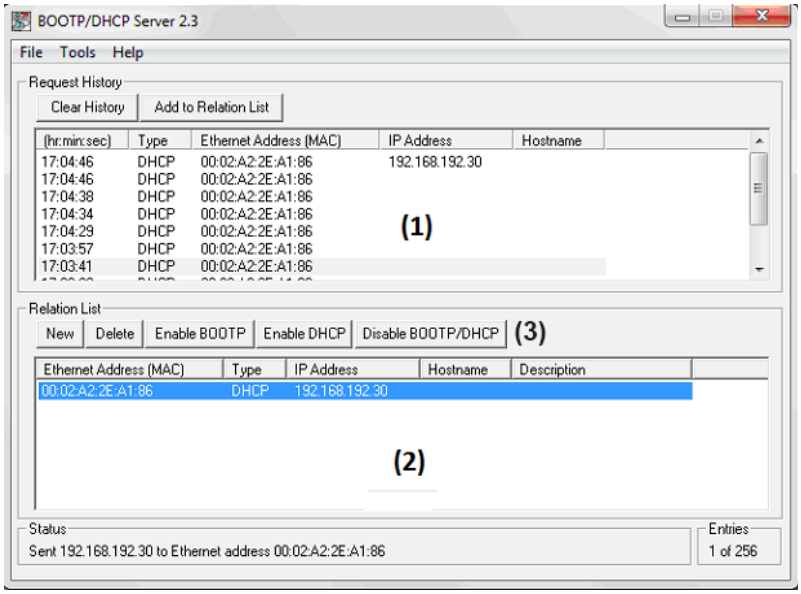


Fig. 6.11: Deactivation of the BOOTP/DHCP mode

=> Select your module from the list (2) "Relation List".
It is shown with a blue background.

=> Press button (2) "Disable BOOTP/DHCP".
The BOOTP/DHCP mode is disabled.

The module then starts up with the set IP address at Power On. This selection can be executed several times.

Important!
The IP address must be active in the module, see the LED description (chapter 6.4.2).

You can save the list of IP addresses.

6.4.4 Reset configuration

In order to be able to assign a different IP address to the module, the module must be reset so that it starts again with the DHCP mode. You can do this in two different ways:

Via the DHCP server (e.g. BOOTP/DHCP server)

=> Start the DHCP program and load the list of assigned IP addresses into the program.
The assigned IP addresses are displayed in the list (2) (Relation List). (Fig. 6.12).

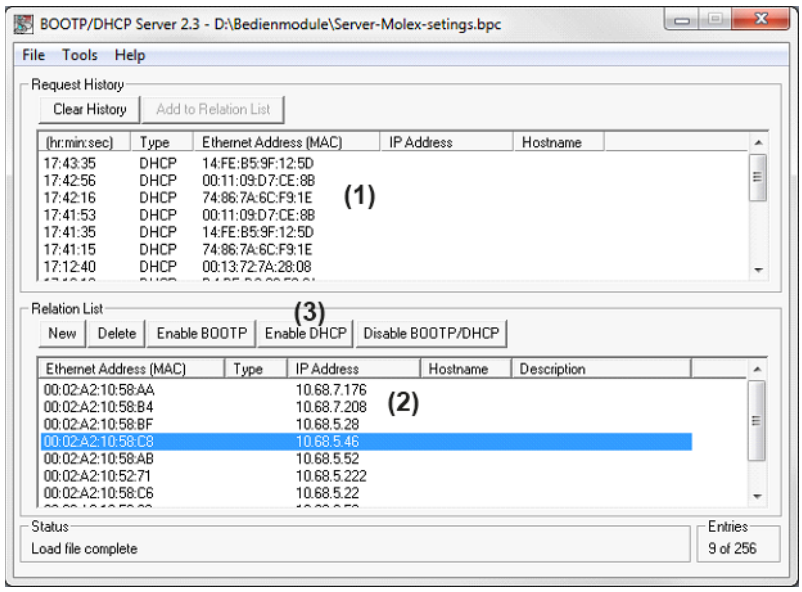


Fig. 6.12: BOOTP/DHCP server with list of IP addresses

=> Select your module from the list (2.
It is shown with a blue background.

=> Press the button (3) "Enable DHCP“.
The DHCP mode is activated.

The module then starts up at Power On in DHCP mode and waits for the assignment of an IP address.

Now a new IP address can be assigned according to chapters 6.4.2 and 6.4.3.

Resetting to factoring default

Description of the factoring default see chapter 4.5

To reset the configuration using the factoring default, you have two options. On the one hand, you can perform factoring default directly on the module using the coding switch SW1 (back of the module). For this purpose, please read the chapters "Installation instructions for all operating modules".

You can also reset the system to the factoring default values, for example with the EIP program from Molex (Fig. 6. 11).

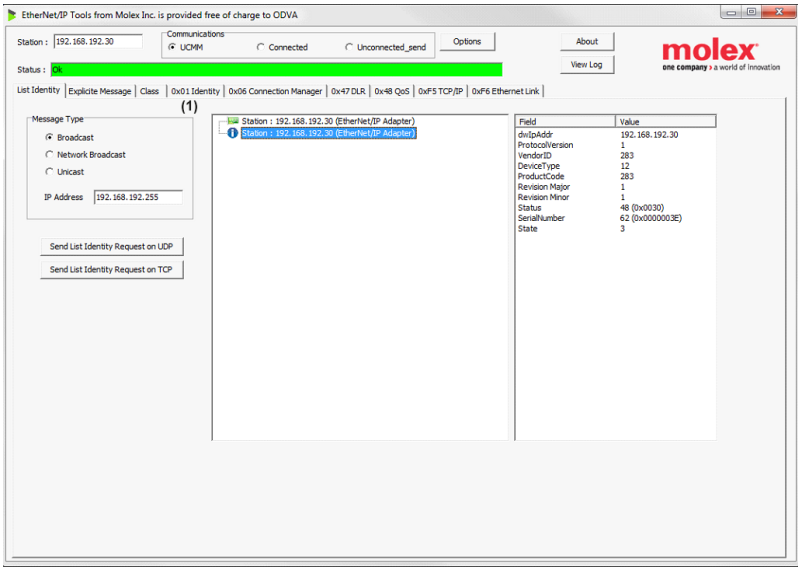


Fig. 6.13: EIP program of the Molex company

=> Go through the "Send List Identify Request" on the "List Identity" page.
The list of connected systems is displayed there.

=> Select your module by mouse click and switch to the page "0x01 Identity" (1).
The page with "Reset Service" appears, Fig. 6.14.

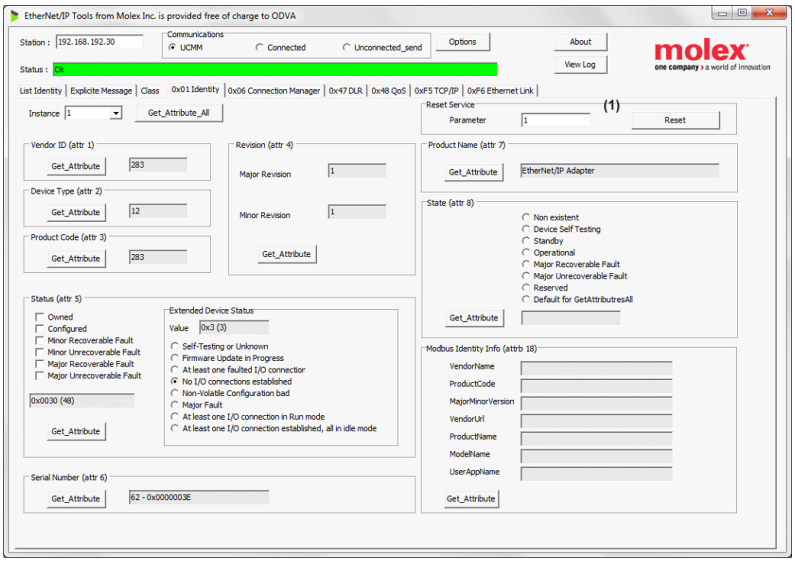


Fig. 6.14: Page with "Reset Service“

Set the parameter for the "Reset Service" (1) accordingly:
0 => Power Cycling: the system performs a reset, then starts up normally.

1 => Reset to factory default : the system activates the DCHP mode and performs a reset, then starts in DHCP-mode and waits for the assignment of an IP address.

=> Select parameter=1 under (1).
The module starts up in DHCP mode.

Now you can assign a new IP address according to chapter 6.4.2 and 6.4.3.

6.4.5 LED control and bit combination

The keys and inputs are read in cyclically with 200 Hz. The LEDs and outputs are actuated every 10 ms.

Each key has a red status LED and RGB LEDs for key illumination. The following bit combinations are used to control the RGB LEDs. For all other combinations, the key illumination is switched off.

Bit red x	Bit green x	Bit blue x	LED control
1	0	0	red
0	1	0	green
0	0	1	blue
1	1	0	yellow
1	1	1	white

OM 2008

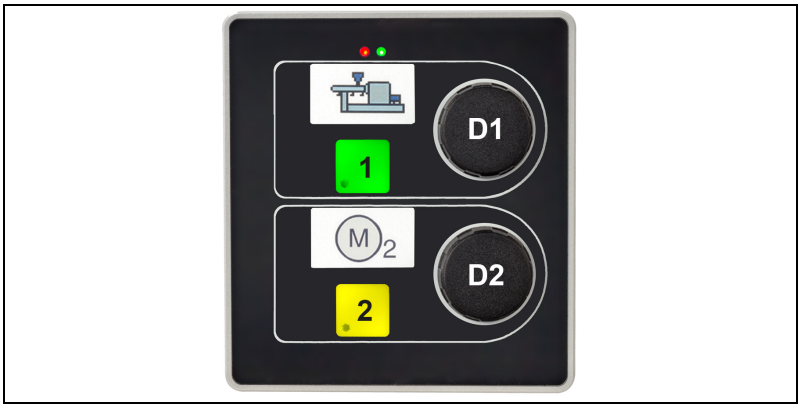
The OM 2008 operation module has 8 keys with LED RGB key illumination and a status LED in each key.

PLC process image of the controller "Input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	Keys

PLC process image of the controller "Output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, red
01	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, green
02	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, blue
03	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	LEDs 1 to 8, status

OM 2002

The OM 2002 operation module has two keys with LED RGB key illumination and status LED, as well as two rotary pulse encoders.



PLC process image of the PLC "input area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
00	x	x	x	x	x	x	**2**	**1**	Key
01	x	x	x	x	x	x	**D2**	**D1**	Rotary pulse encoder
02	0-255								Value encoder D1
03	0-255								Value encoder D2

The rotary pulse encoders operate as 8-bit up/down counters. Counter overflow and counter underflow is not evaluated by the operation module..

PLC process image of the controller "output area"									
Byte offset	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	LED control
00	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, red
01	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, green
02	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, blue
03	x	x	x	x	x	x	**2**	**1**	LEDs 1 to 2, status

7 LED fault diagnosis

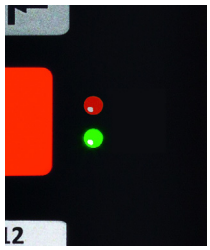
At the front of the operation modules in the right or upper area, depending on the module type, there are two diagnostic LEDs, a red and a green LED.

The two diagnostic LEDs only have the module variants that are equipped with black foil (modules with article numbers 92605 10XX and 92483 10XX).

With the help of these LEDs you can perform a diagnosis in the fault case and correct the fault if necessary. The following LED times apply for flashing cycles:

- Time: LED on 300 ms
- Time: LED off 200 ms
- Time: break 2000 ms

Diagnosis_LED on the front of the device



red LED	green LED	OM 2002 / OM 2008 Head module*	OM 2002 / OM 2008 Sub module*	Description / error handling
Off	Off	No power supply	No power supply	Check the correct cable connection and power supply.
Flashing cycle 1x	On	Hardware error / device defective	Hardware error / device defective	Send the operation module back to Herkules-Resotec Elektronik GmbH.
Flashing cycle 3x	On	SW1 not in position 0	---	The address must be set correctly (to 0). After troubleshooting you have to perform a RESET (SYSTEM/VERBUND).
Flashing cycle 4x	On	SW1 incorrectly set	SW1 incorrectly set	The address must be set correctly (Head module = 0, Sub module = 1...3). After troubleshooting, you must perform a RESET (SYSTEM/VERBUND).
Blinks at 1 Hz intervals	On	---	Communication to head module	Automatically fixed when communication is active again.
Blinks at 2 Hz intervals	On	Communication to the PLC disturbed / established	Communication to the PLC disturbed / established	Automatically remedied when communication is active again
Alternate flashing: the ERR LED and the ON LED light up alternately		Flashing request from project planning tool	---	Only active if the engineering tool makes a request to the OM 2032-F

* only applies to module variants with article numbers 92605 10XX and 92483 10XX

8 Maintenance and Cleaning

8.1 Maintenance

The operation modules are maintenance free. Cyclical maintenance work is therefore not necessary.

However, you should clean the keyboard foil of the operation module at regular intervals or if necessary.

8.2 Care of the keyboard foil

Avoid scratching or damaging the keyboard foil

The operation module's keyboard foil must not be cleaned using an abrasive cleaning agent or a rough cloth. Compressed air and steam jet methods of cleaning are also not permitted.

Only use a soft cloth and mild cleaning agent to avoid damage to the keyboard.

Do not under any circumstance clean the keyboard, of e.g. fingerprints or dirt, while the device is operational, as this could lead to unwanted operation.

CAUTION

=> Turn off the module.

=> Apply the mild cleaning agent to the soft cloth and gently rub the keyboard foil.
Do not pour or spray any liquid directly onto the keyboard foil.

9 Spare parts and accessories

The following spare parts and accessories are deliverable:

Description		Article number
OM 2002	Rotary pulse encoder module	92605 0010
OM 2008	Operation module with 8 keys - Head module PROFINET I/O - Head module Ethernet/IO - Head module Modbus RTU - Head module PROFIBUS-DP - Sub module	 92483 0008 92483 0009 92483 0002 92483 0001 92483 0010
AK 500	Connecting cables for OM Sub Module	92641

10 De-installation and disposal

Deinstall the device in the following way:

=> Switch off the device by disconnecting the power supply. The operation module is not equipped with an off button.

=> Disconnect the electrical connections and the power supply.

=> Remove the device from the front plate of the control panel or from the switch cabinet.

Only qualified personnel are allowed to disassemble and dispose of the Control Module.

Disposal

=> The operation module is made of various different materials. Under no circumstance can it be disposed of in domestic waste.

=> Electrical devices must be disposed of in accordance with the local regulations on waste electrical and electronic equipment.

11 Technical Data

11.1 Technical Data OM 2002

Keys	
Short-stroke keys with insertion strips	2
LED 5-colored (red, green, yellow, blue, white)	2
Status LED	2
Rotary pulse encoder	2
Interfaces	
Resotec module bus (max 7 Sub modules)	2 x RJ45, max. bus length 9 m
Electrical Connection	
Power supply	24 V DC, -15 % to +20 % acc. to IEC 1131-2
Current drawn	< 100 mA
Power consumption	approx. 2,5 W
Protection	
Front	IP 65 acc. to EN 60529
Rear	IP 20 acc. to EN 60529
Environmental Conditions	
Operating temperature	0 to 50 °C
Storage temperature	-20 to 60 °C
Relative humidity	<80 %
Housing	
Overall dimensions (WxH) in mm	115 x 125
Cut-out dimensions (WxH) in mm	105^{-2} x 115^{-2}
Mounting depth	Approx. 50 mm without connector
Front pane	Aluminum front panel with design foil
Housing lid	Stainless steel
Weight	Approx. 0,5 kg
Certificates and Approvals	
CE conformity	EN 61000-6-4 emission EN 61000-6-2 immunity

10.2 Technical Data OM 2008

Keys	
Short-stroke keys with push-in strips	8
LED 5-colored (red, green, yellow, blue and white)	8
Status LED	8 plus 2 additional info LED
Rotary pulse encoder	without
Interfaces	
Resotec module bus (max 7 Sub modules)	2 x RJ45, max. bus length 9 m
Sub modules	
OM 2008	8 keys
OM 2002	2 keys
Fieldbus interfaces (alternative)	
PROFINET IO Device	Module (option), 2 x RJ45 incl. switch
Modbus RTU	Module (option), 1 x 9-pol SUB-D
PROFIBUS-DP Slave	Module (option), 1 x 9-pol. SUB-D
Ethernet /IP Device	Module (option), 2 x RJ45 incl. switch
Electrical Connection	
Power supply	24 V DC, -15 % to +20 % acc. to IEC 1131-2
Current drawn, max. bus length 9 m	< 100 mA
Power consumption	Approx. 2,5 W
Protection	
Front	IP 65 acc. to EN 60529
Rear	IP 20 acc. to EN 60529
Environmental Conditions	
Operating temperature	0 to 50 °C
Storage temperature	-20 to 60 °C
Relative humidity	<80 %
Housing	
Overall dimensions (W x H) in mm	125 x 115
Cut-out dimensions (W x H) in mm	115^{-2} x 105^{-2}
Mounting depth	Approx. 50 mm without connector

Front panel	Aluminum front panel with design foil
Housing lid	Stainless steel
Weight	Approx. 0,5 kg
Certificates and Approvals	
CE conformity	EN 61000-6-4 emission EN 61000-6-2 immunity

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